



TIER 1 DRAFT ENVIRONMENTAL IMPACT STATEMENT

7.2 Land Cover

7.2 LAND COVER

7.2.1 Introduction

This section provides a brief description of the land cover in the Affected Environment and broader Context Area and identifies the potential conversions as well as acquisitions and/or potential for displacements that would result from the No Action and Action Alternatives. This section also includes a review of state and regional plans within the NEC FUTURE Study Area (Study Area) to evaluate the compatibility of the No Action and Action Alternatives with those state and regional efforts.

7.2.1.1 Definition of Resource

Land cover is the observed physical cover on the earth's surface. The identification of land cover classifications is based on the National Land Cover Database developed by the Multi-Resolution Land Characteristics Consortium within the U.S. Environmental Protection Agency.¹

Land cover was divided into nine categories for the Tier 1 Draft Environmental Impact Statement (Tier 1 Draft EIS) analysis. These categories cover the entire Study Area and are further defined within the Land Cover Effects-Assessment Methodology in Appendix E, Section E.02. In this Tier 1 Draft EIS analysis, land cover is generally discussed as either developed or undeveloped as described below:

- 4 **Developed** land cover represents constructed materials such as single-family housing units, apartment complexes, and commercial and industrial structures. The categories of developed land include five of the nine land cover categories: Developed, open space; Developed, low intensity; Developed, medium intensity; Developed, high intensity; and Barren Land. Barren Land is included in the developed land cover because it has development potential, and is compatible with transportation use.
- 4 **Undeveloped** land cover represents unbuilt natural areas, which include the following four land cover categories: Open Water, Forest/Shrub, Grassland/Cultivated, and Wetlands.

Land use is characterized by the physical arrangements, patterns, and activities within a certain land cover type that produce, change, or maintain the land cover. Specific land uses, such as residential, commercial, or industrial land uses, are not identified or described in this Tier 1 Draft EIS analysis because land use is not reported consistently throughout the Study Area. However, land use is

Key Resource: Land Cover

- § Critical in understanding effects on other key resources.
 - § Identifies acreage of potential acquisitions, which may result in future displacements.
 - § Types of effects include potential for land cover conversion to a transportation-related land use, or changes to existing land cover that could result in loss or fragmentation of ecological resources; loss of or changes to hydrologic resources; conversion of recreational resources; acquisitions and displacements; and conversion of prime farmlands or timberlands.
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¹ Multi-Resolution Land Characteristics Consortium partners include the U.S. Environmental Protection Agency; National Oceanic and Atmospheric Administration; U.S. Forest Service; U.S. Geological Survey; Bureau of Land Management; National Park Service; National Aeronautics and Space Administration; U.S. Fish and Wildlife Service; National Agricultural Statistics Service; and U.S. Army Corps of Engineers.

discussed in reference to identified goals and objectives of state and regional plans, and whether the Action Alternatives support those goals and objectives.

7.2.1.2 Effects-Assessment Methodology

The Federal Railroad Administration (FRA) developed an effects-assessment methodology for land cover (see Appendix E, Section E.02). The effects-assessment methodology and land cover data sources explain how the Affected Environment was defined and established and how the effects on land cover were evaluated and reported. Table 7.2-1 summarizes key factors associated with the effects-assessment methodology for land cover.

Table 7.2-1: Effects-Assessment Methodology Summary: Land Cover

| Resource | Affected Environment | Type of Assessment | Outcome |
|----------------|--|---|---|
| Land Cover | ½-mile-wide swath centered on the Representative Route for each Action Alternative | Quantitative: Acres | Identification of acres affected by the Representative Route for each Action Alternative using the NEC FUTURE Land Cover Classification categories and identification of acres where there is: <ul style="list-style-type: none"> ■ Potential for conversion of land cover to transportation use. ■ Potential for acquisitions and/or displacements of public and/or private lands. |
| Land Use Plans | Study Area | Qualitative: Goals and objectives within statewide land-use-related planning documents and regional planning documents developed by federally-mandated metropolitan planning organizations. | Identification of land cover-related goals and objectives supportive of 1) rail transportation; 2) transit-oriented development; and 3) preservation of the built and natural environment to determine compatibility with the NEC FUTURE goals and objectives. |

Source: NEC FUTURE Land Cover Effects-Assessment Methodology, Appendix E, Section E.02, 2014

The FRA reviewed land cover within the Representative Route of each Action Alternative using geographic information system (GIS) to identify the number of acres of developed and undeveloped land cover in the Affected Environment. GIS was also used to estimate the potential number of acres that would be converted to a transportation use, as well as to estimate the potential acreages of acquisitions and the potential for displacements that would be required for each of the Action Alternatives. An acquisition is the process of acquiring real property (real estate) or some interest therein. A displacement is the necessary relocation of a land occupant. Acquisitions could result in future displacements; **however, those displacements would be quantified only as part of a Tier 2 analysis.** The land cover analysis and calculations did not include open waters that extend beyond the state and county coastlines.

Potential Conversion of Land Cover

To calculate potential land cover conversions, the analysis considered the land cover within the Representative Route. The Action Alternatives were considered most compatible with developed land cover, which is inclusive of existing transportation use, such as rail tracks, highways, and other transportation infrastructure. Therefore, within areas of existing transportation use, there would be minimal potential for conversion of developed land cover within the Representative Route.

Undeveloped land cover was considered least compatible with the Action Alternatives since it would be converted from undeveloped to developed land cover. Therefore, there would be a greater potential for conversion of undeveloped land cover within the Representative Routes that are off-corridor. Where the Representative Route includes a major bridge or tunnel, acreage of potential land conversions was not calculated, since the potential for conversion of the land cover at surface grade would be negligible.

Potential Acquisitions and Displacements

Potential conversions of land cover may result in acquisitions of private or public lands. Acquisitions could result in displacements in developed lands. To calculate the potential acquisitions and the potential for displacements, the analysis considered only the land cover where the Representative Route did not coincide with the existing NEC right-of-way since there would be minimal potential for acquisitions or displacements within the existing NEC right-of-way. Where there would be potential conversions of undeveloped land cover, an acquisition or displacement would be more likely. The analysis for potential acquisitions and displacements also includes tunnels and major bridge construction types because temporary acquisitions may be required to accommodate construction activities. For purposes of this Tier 1 Draft EIS analysis, it is assumed that for these construction types (tunnel or major bridge), potential acquisitions associated with construction would not permanently convert surface land cover.

7.2.2 Resource Overview

Implementation of the No Action or Action Alternatives could result in the conversion or change of an existing land cover type to a different land cover type due to modification of existing rail infrastructure, such as expansion of rail rights-of-way, and/or construction of new rail infrastructure, such as railroad tracks or stations. Changes in land cover type could result in a land use that is incompatible with surrounding land uses. Conversion of developed land cover could result in land acquisitions and displacements. Conversion of undeveloped land cover to developed land cover could result in loss or fragmentation of animal and/or plant habitat, dredge and fill of wetlands, encroachment of floodplains, and conversion of farmland/timberlands to different land uses.

Developed land cover is concentrated around the major metropolitan areas within the Study Area and areas along the existing NEC. Developed land cover includes transportation uses. Therefore, transportation uses would be compatible with developed land cover. Undeveloped land cover is generally concentrated in rural and natural locations outside the metropolitan areas within the Study Area, and includes waterbodies. Transportation uses would be the least compatible for undeveloped land covers, since it would convert to developed land cover.

Within the Study Area, Connecticut and Maryland contain the greatest concentrations of undeveloped land cover. Within the Affected Environment, Connecticut tends to have the largest acreage of the following types of undeveloped land cover: Open Water, Forest/Shrub, and Wetlands; Maryland has the largest acreages of Grassland/Cultivated land cover. (See Appendix E, Section E.02 for a description of land cover categories.) This pattern of undeveloped land cover in Connecticut and Maryland is consistent across the Action Alternatives, primarily where the Representative Route includes new off-corridor segments through undeveloped land cover. (See Section 7.2.3. for full details of land cover within the Affected Environment.)

The majority of land conversions associated with all Action Alternatives occurs in Maryland and Connecticut. Key findings for the analysis of the NEC FUTURE No Action and Action Alternatives' effects on Land Cover are listed below:

4 Benefits

- The goals and objectives identified for the NEC FUTURE program were found to be generally supportive and compatible with approximately 50% of planning documents developed by states and metropolitan planning organizations (MPO) identified and reviewed by FRA for the Study Area in regards to rail transportation, transit-oriented development and preservation of the built and natural environment.
- Improvements to the NEC can influence land development patterns that may limit sprawl by concentrating development around transportation corridors.

4 Impacts

- Land conversions primarily occur with new off-corridor segments.
 - Under all Action Alternatives, Maryland and Connecticut have the highest acreage of land conversions.
 - When comparing all Action Alternatives, the least land conversions occur under Alternative 1 and the greatest occur under Alternative 3 with the route options via Long Island and Worcester.
 - The No Action Alternative primarily comprises improvements on the existing NEC, thereby minimizing the need for possible land conversions.
- Land conversions of developed land have the greatest potential to result in acquisitions that have associated displacements.
 - Under Alternatives 1 and 2, the greatest conversions of developed land occur in Connecticut.
 - Under Alternative 3, the greatest conversion of developed land occurs in Maryland, New York, and Connecticut.
- Land conversions of undeveloped land have the greatest effect on natural resources.
 - Among all Action Alternatives, the greatest conversion of undeveloped land occurs in Connecticut under Alternative 2.

7.2.3 Affected Environment

Table 7.2-2 shows the number of acres of developed and undeveloped land cover within the Affected Environment of the existing NEC and each Action Alternative. The land cover pattern along the existing NEC is a mix of developed and undeveloped lands. Developed lands are located within major metropolitan areas such as Washington, D.C., Philadelphia, PA, New York City, NY, and Boston, MA. Developed land also typically occurs near major transportation corridors and facilities connecting these major metropolitan areas. Developed land characteristics along the existing NEC support densely populated areas with varying degrees of development densities. Characteristics of undeveloped land along the existing NEC are typical of rural areas and include agricultural lands, low-density housing, and natural areas such as parks, forested land, and water bodies. This land pattern is consistent for all of the Action Alternatives. Large concentrations of undeveloped land occur in the more rural areas associated with the Alternative 3 route options through western New York and Connecticut. (Appendix E, Section E.02, lists all land cover within the Affected Environment by state and county.)

Table 7.2-2: Affected Environment: Developed and Undeveloped Land Cover by Action Alternative

| Geography | Land Cover | Existing NEC (acres) | Alternative 1 (acres) | Alternative 2 (acres) | Alternative 3 (acres) |
|-----------|-------------|----------------------|-----------------------|-----------------------|-----------------------|
| D.C. | Developed | 1,300 | 1,300 | 1,300 | 1,330 |
| | Undeveloped | 175 | 175 | 175 | 180 |
| MD | Developed | 17,180 | 17,655 | 18,915 | 25,555 |
| | Undeveloped | 10,640 | 10,645 | 13,715 | 16,790 |
| DE | Developed | 5,480 | 5,480 | 6,520 | 6,405 |
| | Undeveloped | 1,420 | 1,420 | 1,825 | 1,740 |
| PA | Developed | 13,945 | 13,945 | 14,260 | 19,345 |
| | Undeveloped | 1,580 | 1,580 | 1,805 | 1,870 |
| NJ | Developed | 13,830 | 13,875 | 14,585 | 15,420 |
| | Undeveloped | 4,365 | 4,365 | 4,420 | 4,645 |
| NY | Developed | 8,695 | 8,725 | 9,945 | 15,265–28,845 |
| | Undeveloped | 430 | 430 | 485 | 1,820–6,905 |
| CT | Developed | 24,385 | 29,590 | 39,185 | 37,875–42,245 |
| | Undeveloped | 10,220 | 15,430 | 24,825 | 20,865–30,810 |
| RI | Developed | 8,745 | 9,375 | 11,440 | 8,745–11,445 |
| | Undeveloped | 6,905 | 8,500 | 11,705 | 6,905–11,700 |
| MA | Developed | 7,940 | 7,940 | 8,395 | 8,540–20,665 |
| | Undeveloped | 4,180 | 4,180 | 4,575 | 4,670–12,265 |
| TOTAL | Developed | 101,500 | 107,880 | 124,545 | 141,810–167,925 |
| | Undeveloped | 39,910 | 46,720 | 63,535 | 67,070–79,300 |

Source: National Land Cover Database and NEC FUTURE team, 2015

7.2.3.1 Existing NEC

Of the states within the Affected Environment of the existing NEC, Connecticut contains the most acreage of both developed and undeveloped land cover. Forest/Shrub land cover is the most prominent undeveloped land cover in Connecticut.

7.2.3.2 Alternative 1

Similar to the existing NEC, of the states within the Affected Environment of Alternative 1, Connecticut contains the most acreage of both developed and undeveloped land cover, and Forest/Shrub land cover is the most prominent undeveloped land cover. Because of the Affected Environment of the Old Saybrook-Kenyon new segment, this Action Alternative includes more acres of both developed and undeveloped land cover in New London County compared to the existing NEC.

7.2.3.3 Alternative 2

Similar to the existing NEC and Alternative 1, of the states within the Affected Environment of Alternative 2, Connecticut contains the most acreage of both developed and undeveloped land cover, and Forest/Shrub land cover is the most prominent undeveloped land cover. Within the Affected Environment of the New Haven-Hartford-Providence routing option outside the existing NEC through New Haven, Hartford, Tolland, and Windham Counties, there are many acres of developed and undeveloped land cover.

7.2.3.4 Alternative 3

Washington, D.C., to New York City

Of the states within the Affected Environment of Alternative 3, Washington D.C., to New York City portion, Maryland contains the most acreage of both developed and undeveloped land cover. Forest/Shrub land cover is the most prominent undeveloped land cover in Maryland.

New York City to Hartford

Via Central Connecticut

Similar to the existing NEC and Alternatives 1 and 2, of the states within the Affected Environment of Alternative 3, New York City to Hartford via Central Connecticut portion, Connecticut contains the greatest number of acres of both developed and undeveloped land cover, specifically within Fairfield, New Haven, and Hartford Counties. Forest/Shrub is the most prominent undeveloped land cover in Connecticut.

Via Long Island

Similar to the existing NEC and Alternatives 1 and 2, of the states within the Affected Environment of Alternative 3, New York City to Hartford via Long Island portion, Connecticut contains the greatest number of acres of both developed and undeveloped land cover. Nassau and Suffolk Counties in New York contain a substantial number of developed acreages but not as many as Connecticut. Forest/Shrub is the most prominent land cover in Connecticut.

Hartford to Boston

Via Providence

Similar to the existing NEC, of the states within the Affected Environment of Alternative 3, Hartford to Boston via Providence portion, Connecticut contains the greatest number of both developed and undeveloped land cover. Forest/Shrub is the most prominent undeveloped land cover in Connecticut, specifically within Windham County.

Via Worcester

For this routing option, of the states within the Affected Environment of Alternative 3, Hartford to Boston via Worcester portion, Massachusetts contains the greatest number of both developed and undeveloped land cover. Forest/Shrub is the most prominent undeveloped land cover in Massachusetts, specifically within Worcester County.

7.2.4 Environmental Consequences

7.2.4.1 Potential Conversions

Table 7.2-3 shows the potential numbers of acres of developed and undeveloped land cover by state and Washington, D.C., that would be converted within the Representative Route of each Action Alternative. Potential conversions of Forest/Shrub and Wetlands land cover, identified as undeveloped land cover, include Prime Timberland and Prime Farmland soils, as well as environmentally sensitive aquatic and terrestrial habitats. Conversion of these land cover types would potentially result in deforestation, loss of natural areas/habitat or fragmentation of habitat, dredge and fill of Wetlands, and conversion of agricultural lands to nonagricultural uses. The addition of rail service to areas that are not served by rail or that may have limited service may induce change and influence land development patterns adjacent to the rail and at new station areas.

Table 7.2-3: Environmental Consequences: Potential Conversions of Developed and Undeveloped Land

| Geography | Land Cover | Existing NEC (acres) | Alternative 1 (acres) ¹ | Alternative 2 (acres) ¹ | Alternative 3 (acres) ¹ |
|--------------|--------------------|----------------------|------------------------------------|------------------------------------|------------------------------------|
| D.C. | Developed | 75 | 75 | 75 | 115 |
| | Undeveloped | 1 | 1 | 1 | 10 |
| MD | Developed | 1,285 | 1,285 | 1,365 | 3,080 |
| | Undeveloped | 260 | 260 | 415 | 1,055 |
| DE | Developed | 385 | 385 | 495 | 990 |
| | Undeveloped | 35 | 35 | 60 | 160 |
| PA | Developed | 855 | 855 | 820 | 1,945 |
| | Undeveloped | 10 | 10 | 20 | 60 |
| NJ | Developed | 910 | 910 | 1,230 | 2,045 |
| | Undeveloped | 100 | 110 | 115 | 390 |
| NY | Developed | 440 | 440 | 660 | 830–1,705 |
| | Undeveloped | 30 | 30 | 30 | 130–145 |
| CT | Developed | 1,540 | 1,895 | 2,740 | 1,970–2,755 |
| | Undeveloped | 495 | 635 | 1,085 | 670–1,030 |
| RI | Developed | 540 | 585 | 585 | 540–595 |
| | Undeveloped | 345 | 515 | 625 | 345–630 |
| MA | Developed | 450 | 450 | 500 | 875–950 |
| | Undeveloped | 210 | 210 | 270 | 380–635 |
| TOTAL | Developed | 6,475 | 6,875 | 8,470 | 12,450–14,120 |
| | Undeveloped | 1,490 | 1,805 | 2,620 | 3,200–4,115 |

Source: National Land Cover Database and NEC FUTURE team, 2015

¹ All Action Alternatives assume improvements to the existing NEC; therefore, the acreages presented include the Environmental Consequences inclusive of improvements to the existing NEC and any new routing option or off-corridor route associated with each Action Alternative.

Table 7.2-4 and Table 7.2-5 show the approximate number of acres of developed and undeveloped land cover, respectively, by state that would be converted within the Representative Route for the Alternative 3 route options. (See Appendix E, Section E.02, for a complete list of all potential conversions by state and county.)

Table 7.2-4: Environmental Consequences: Representative Route of Alternative 3 Route Options – Potential Conversions of Developed Land

| Geography | Existing NEC (acres) | Alternative 3 | | | | |
|--------------|----------------------|---------------------|---------------------------------|-------------------------|------------------------|-----------------------|
| | | D.C. to NYC (acres) | New York City to Hartford | | Hartford to Boston | |
| | | | via Central Connecticut (acres) | via Long Island (acres) | via Providence (acres) | via Worcester (acres) |
| D.C. | 75 | 115 | — | — | — | — |
| MD | 1,285 | 3,080 | — | — | — | — |
| DE | 385 | 990 | — | — | — | — |
| PA | 855 | 1,945 | — | — | — | — |
| NJ | 910 | 2,045 | — | — | — | — |
| NY | 440 | — | 830 | 1,705 | — | — |
| CT | 1,540 | — | 1,395 | 1,950 | 575 | 960 |
| RI | 540 | — | — | — | 595 | 540 |
| MA | 450 | — | — | — | 875 | 950 |
| TOTAL | 6,475 | 8,175 | 2,225 | 3,650 | 2,050 | 2,450 |

Source: NEC FUTURE team, 2015

— = Not applicable within that alternative/route option.

Table 7.2-5: Environmental Consequences: Representative Route of Alternative 3 Route Options – Potential Conversions of Undeveloped Land

| Geography | Existing NEC (acres) | Alternative 3 | | | | |
|--------------|----------------------|---------------------|---------------------------------|-------------------------|------------------------|-----------------------|
| | | D.C. to NYC (acres) | New York City to Hartford | | Hartford to Boston | |
| | | | via Central Connecticut (acres) | via Long Island (acres) | via Providence (acres) | via Worcester (acres) |
| D.C. | 1 | 10 | — | — | — | — |
| MD | 260 | 1,055 | — | — | — | — |
| DE | 35 | 160 | — | — | — | — |
| PA | 10 | 60 | — | — | — | — |
| NJ | 100 | 390 | — | — | — | — |
| NY | 30 | — | 145 | 130 | — | — |
| CT | 495 | — | 195 | 345 | 685 | 510 |
| RI | 345 | — | — | — | 630 | 345 |
| MA | 210 | — | — | — | 635 | 380 |
| TOTAL | 1,490 | 1,675 | 340 | 475 | 1,950 | 1,235 |

Source: NEC FUTURE team, 2015

— = Not applicable within that alternative/route option.

No Action Alternative

Most activities included as part of the No Action Alternative occur primarily within the right-of-way of the existing NEC; therefore, the potential for land conversions of occur under the No Action Alternative is minimal.

Alternative 1

Most of the potential conversions of undeveloped land cover would occur in Connecticut, where the addition of the new Old Saybrook-Kenyon segment is proposed outside the existing NEC through New London County. Undeveloped land in New London County is primarily categorized as Forest/Shrub and Wetlands. The conversion of Forest/Shrub and Wetlands would result in the potential deforestation, dredging and filling of Wetlands, loss of natural habitats or fragmentation of habitats.

The potential benefits to land cover as they relate to Alternative 1 are that improvements would generally stay near the existing NEC, which would likely encourage development patterns to remain similar to current conditions.

Alternative 2

The potential conversions of undeveloped land cover would primarily occur in Connecticut, with the addition of the New Haven-Hartford-Providence route option. This segment occurs outside the existing NEC through New Haven, Hartford, Tolland, and Windham Counties and includes many acres of undeveloped land cover. The majority of the conversions would occur in New London and New Haven Counties. In New London County, Wetlands is the most prominent undeveloped land cover. Forest/Shrub is the most prominent undeveloped land cover in New Haven County. Conversion of these land cover types would potentially result in dredging and filling of wetland areas, loss of natural habitats or fragmentation of habitats. The addition of the New Haven-Hartford-Providence segment may encourage development in areas that are not as developed under current conditions.

Benefits on land cover associated with Alternative 2 would be similar to Alternative 1; many improvements would focus on and occur along the existing NEC, therefore continuing existing land development patterns.

Alternative 3

Washington, D.C., to New York City

South of New York City, Alternative 3 provides a second spine adjacent to the existing NEC right-of-way. Six-track segments extend from Washington, D.C., to Baltimore, and Philadelphia to New York City. Most of the potential conversions of undeveloped land cover would occur in Baltimore, Hartford, and Cecil Counties, MD. The greatest acreage of land conversion would occur in Cecil County and would include Forest/Shrub, Grassland/Cultivated, and Wetlands between Furnace Bay Golf Course and the community of Elk Mills adjacent to the Pulaski Highway. Potential conversions of these land types would result in deforestation, conversion of agricultural lands into nonagricultural uses, dredging/filling of Wetlands, and loss of or fragmentation of natural habitats.

The addition of the second spine south of New York City would provide the benefit of likely encouraging land development patterns to remain consistent with existing land development patterns.

New York City to Hartford

Via Central Connecticut

This route option goes off-corridor through New York City and into Connecticut, through Danbury and on to Hartford. Westchester County, NY, would account for the greatest acreage of potential conversions of undeveloped land cover, primarily Forest/Shrub, in this route option. Potential conversions of these land types would result in deforestation and loss of or fragmentation of natural habitats.

Via Long Island

This route option also goes off-corridor from the existing NEC and provides a connection to Hartford, CT, by way of the Long Island Sound. The most conversions would occur in Connecticut, particularly in New London and New Haven Counties. Land cover is primarily Wetland and Forest/Shrub. Potential conversion of these land types would result in dredging/filling of Wetlands, deforestation, and loss or fragmentation of natural habitats.

Hartford to Boston

Via Providence

This route option continues east from Hartford, CT, into Rhode Island and begins to parallel the existing NEC again in Bristol County, MA. Massachusetts contains the most acreage (approximately 425 acres) of potential conversions of undeveloped land cover within the Representative Route. In particular, Norfolk County, MA, accounts for the greatest acreage of potential conversions of undeveloped land cover (Forest/Shrub) in this route option. Potential conversion of these land types would result in deforestation, and loss or fragmentation of natural habitats.

Via Worcester

This route option continues northeast from Hartford, CT, through Connecticut before entering Massachusetts. The most acreage (165 acres) of potential conversions of undeveloped land cover would occur in Worcester County, MA, where the Forest/Shrub is the most prominent undeveloped land cover.

7.2.4.2 Acquisitions and Displacements

Table 7.2-6 shows the potential acquisitions by land cover type for each Action Alternative. Potential displacements have not been individually identified and are not quantified for this Tier 1 Draft EIS. To calculate the potential acquisitions, the analysis considered only the land cover where the Representative Route does not represent the existing NEC right-of-way since there would be minimal potential for acquisitions along the existing NEC right-of-way. (Appendix E, Section E.02, contains a complete list of all potential acquisition acreage by state and county.) Table 7.2-7 and Table 7.2-8 show the potential acquisitions of developed and undeveloped land cover, respectively, for the Alternative 3 route options.

Table 7.2-6: Environmental Consequences: Potential Acquisitions

| Geography | Land Cover | Alternative 1 (acres) ¹ | Alternative 2 (acres) ¹ | Alternative 3 (acres) ¹ |
|--------------|--------------------|------------------------------------|------------------------------------|------------------------------------|
| D.C. | Developed | — | — | 60 |
| | Undeveloped | — | — | 10 |
| MD | Developed | 40 | 175 | 1,620 |
| | Undeveloped | — | 170 | 780 |
| DE | Developed | — | 90 | 385 |
| | Undeveloped | — | 35 | 110 |
| PA | Developed | — | 325 | 1,035 |
| | Undeveloped | — | 25 | 60 |
| NJ | Developed | 25 | 310 | 895 |
| | Undeveloped | 5 | 15 | 255 |
| NY | Developed | 20 | 205 | 620–1,800 |
| | Undeveloped | — | 5 | 120–340 |
| CT | Developed | 450 | 1,340 | 910–1,500 |
| | Undeveloped | 250 | 910 | 540–1,145 |
| RI | Developed | 50 | 170 | 0–215 |
| | Undeveloped | 150 | 280 | 0–290 |
| MA | Developed | — | 50 | 350–845 |
| | Undeveloped | — | 45 | 230–335 |
| TOTAL | Developed | 585 | 2,660 | 6,090–8,140 |
| | Undeveloped | 405 | 1,490 | 2,215–3,225 |

Source: National Land Cover Database and NEC FUTURE team, 2015

¹ All Action Alternatives assume improvements to the existing NEC; therefore, the acreage presented include the Environmental Consequences inclusive of improvements to existing NEC and any new routing option or off-corridor route associated with each Action Alternative.

— = Not applicable within that alternative.

Table 7.2-7: Environmental Consequences: Representative Route of Alternative 3 Route Options – Potential Acquisitions of Developed Land

| Geography | Existing NEC (acres) | Alternative 3 | | | | |
|--------------|----------------------|---------------------|---------------------------------|-------------------------|------------------------|-----------------------|
| | | D.C. to NYC (acres) | New York City to Hartford | | Hartford to Boston | |
| | | | via Central Connecticut (acres) | via Long Island (acres) | via Providence (acres) | via Worcester (acres) |
| D.C. | 75 | 60 | — | — | — | — |
| MD | 1,330 | 1,620 | — | — | — | — |
| DE | 385 | 385 | — | — | — | — |
| PA | 865 | 1,035 | — | — | — | — |
| NJ | 940 | 895 | — | — | — | — |
| NY | 490 | — | 620 | 1,800 | — | — |
| CT | 1,555 | — | 675 | 1,025 | 240 | 465 |
| RI | 550 | — | — | — | 215 | — |
| MA | 485 | — | — | — | 350 | 845 |
| TOTAL | 6,670 | 3,995 | 1,290 | 2,820 | 805 | 1,310 |

Source: NEC FUTURE team, 2015

— = Not applicable within that alternative/route option.

Table 7.2-8: Environmental Consequences: Representative Route of Alternative 3 Route Options – Potential Acquisitions of Undeveloped Land

| Geography | Existing NEC (acres) | Alternative 3 | | | | |
|--------------|----------------------|---------------------|---------------------------------|-------------------------|------------------------|-----------------------|
| | | D.C. to NYC (acres) | New York City to Hartford | | Hartford to Boston | |
| | | | via Central Connecticut (acres) | via Long Island (acres) | via Providence (acres) | via Worcester (acres) |
| D.C. | 5 | 10 | — | — | — | — |
| MD | 275 | 780 | — | — | — | — |
| DE | 35 | 110 | — | — | — | — |
| PA | 15 | 60 | — | — | — | — |
| NJ | 100 | 255 | — | — | — | — |
| NY | 30 | — | 340 | 120 | — | — |
| CT | 505 | — | 500 | 360 | 675 | 165 |
| RI | 345 | — | — | — | 290 | — |
| MA | 210 | — | — | — | 230 | 335 |
| TOTAL | 1,525 | 1,215 | 840 | 480 | 1,195 | 500 |

Source: NEC FUTURE team, 2015

— = Not applicable within that alternative/route option.

No Action Alternative

Most activities included as part of the No Action Alternative occur primarily within the right-of-way of the existing NEC; therefore, the potential for acquisitions and displacements to occur under the No Action Alternative is minimal.

Alternative 1

Most of the acquisitions of both developed and undeveloped land cover would occur in Connecticut, particularly in New London County, where the addition of the new Old Saybrook-Kenyon segment outside the existing NEC runs through New London County.

Alternative 2

The most acquisitions of both developed and undeveloped land cover would occur in Connecticut, where the addition of the New Haven-Hartford-Providence segment is outside the existing NEC through New Haven, Hartford, Tolland, and Windham Counties. The most acreage of Forest/Shrub land that would be acquired would occur in Windham County. Potential acquisitions in Windham County would include Prime Timberland and Prime Farmland soils and environmentally sensitive terrestrial habitats.

Alternative 3

Washington, D.C., to New York City

Most of the acquisitions of undeveloped land cover would occur in Maryland, where new track and segments outside the existing NEC through Baltimore, Harford, and Cecil Counties include many acres of undeveloped land cover.

Of the potential acquisitions in Maryland, most would occur in Cecil County. Potential acquisitions to undeveloped land cover would include Forest/Shrub, Grassland/Cultivated, and Wetlands on new segments between Furnace Bay Golf Course and the community of Elk Mills adjacent to the Pulaski Highway.

New York City to Hartford

Via Central Connecticut

Connecticut contains the most acreage of potential acquisitions to land cover within the Representative Route. New Haven County, CT, accounts for the greatest acreage of potential acquisitions to undeveloped land cover for this route option. Forest/Shrub is the most prominent undeveloped land cover in New Haven.

Via Long Island

New York contains the most acreage of potential acquisitions to land cover within the Representative Route. Suffolk County, NY, accounts for the greatest acreage of potential acquisitions to undeveloped land cover for the route option. Forest/Shrub is the most prominent undeveloped land cover in Suffolk County.

Hartford to Boston

Via Providence

Connecticut contains the most acreage of potential acquisitions to land cover within the Representative Route. Windham County, CT, accounts for the greatest acreage of potential acquisitions to undeveloped land cover for the route option. Forest/Shrub is the most prominent undeveloped land cover in Windham County.

Via Worcester

Massachusetts contains the most acreage of potential acquisitions to land cover within the Representative Route. Worcester County, MA, accounts for the greatest acreage of potential acquisitions to undeveloped land cover for the route option. Forest/Shrub is the most prominent undeveloped land cover in Worcester County.

Stations

The Action Alternatives include continued service to existing stations along the NEC, modifications to existing stations, which may require an increase in the station footprint, and new stations (Table 7.2-9). There is no potential for conversion of land cover, or acquisition of private or public land at existing stations where no modifications would occur. Potential for land cover conversion or acquisition of private or public land would be minimal at stations where modifications are proposed and there is an increase in the station footprint. The potential for conversion of land cover and acquisition of public or private property is associated with areas where new stations are proposed. Stations areas considered for potential conversions and acquisitions could result in future displacements. The numbers of acres of potential acquisition and displacement at station areas are not quantified at this time because part of the station areas are included within the Representative Route and are included in Table 7.2-6 through Table 7.2-8. (Appendix E, Section E.02, contains a complete list of all land cover within station footprints by state and county.)

Table 7.2-9: Environmental Consequences: Stations – Potential Conversions of Undeveloped Land Cover

| State | County | Station ID/Type | Station Name | Alternative 1 | Alternative 2 | Alternative 3 |
|-------|----------------|-----------------|------------------------|---------------|---------------|---------------|
| MD | Anne Arundel | 6/New | BWI Airport H.S. | | | X |
| | Baltimore City | 13/New | Bayview | X | X | X |
| | | 14/New | Bayview H.S. | | | X |
| DE | New Castle | 26/New | Newport | X | X | X |
| NJ | Middlesex | 62/New | North Brunswick | X | X | X |
| NY | Bronx | 81/New | Co-op City | X | X | X |
| | Westchester | 151/New | White Plains East | | | X |
| CT | Fairfield | 154/New | Danbury | | | X |
| | New Haven | 155/New | Waterbury South | | | X |
| | Middlesex | 120/New | Old Saybrook H.S. | X | | |
| | New London | 124/New | Mystic/New London H.S. | X | | |
| | Hartford | 161/New | Newington | | X | |
| | Tolland | 165/New | Willimantic/Storrs | | X | X |
| | | 166/New | Tolland/Storrs | — | — | X |
| MA | Worcester | 174/New | Westborough | — | — | X |
| | | 175/New | Blue Star Hwy (I-495) | — | — | X |
| | Middlesex | 176/New | Southborough/Ashland | — | — | X |
| | | 178/New | Framingham | — | — | X |
| | | 181/New | Riverside (I-95) | — | — | X |

Source: National Land Cover Database and NEC FUTURE team, 2015

Note: Quantities of impacts associated with stations are not shown. Acreage has been calculated only for new stations and is provided in Appendix E, Section E.02.

X = Undeveloped Land Cover within the new station footprint where potential conversion, acquisition, displacement could occur; effects would be subject to Tier 2 analysis.

Blank Cell = No effects identified for subject resource for listed station for specified alternative.

— = Not applicable within that alternative.

H.S. = high speed

7.2.5 Context Area

For all Action Alternatives, the Context Area consists of higher percentages of undeveloped land cover than the Affected Environment. This indicates that should the Representative Route shift, there would be a potential to affect a greater share of undeveloped land cover, which could be incompatible with transportation uses and result in more land cover conversions, acquisitions, and displacements.

7.2.6 State and Regional Plan Analysis

The FRA reviewed the existing goals and objectives of planning documents developed by the states and metropolitan planning organizations (MPO) within the Study Area to identify compatibility of NEC FUTURE with these plans. Consistent with the NEC FUTURE goals (as identified in Chapter 3, Purpose and Need) related to passenger rail improvements, environmental sustainability, and economic growth, the FRA performed the following:

1. Identified three land cover-related goals and objectives: improved passenger rail transportation, transit-oriented development, and preservation of the built or natural environment

2. Reviewed the existing goals and objectives of planning documents developed by the states and MPOs within the Study Area
3. Identified those planning documents that included land-cover-related goals and objectives of improved passenger rail transportation, transit-oriented development, and preservation of the built or natural environment

NEC FUTURE is considered compatible with planning documents that identified all of these goals and objectives. NEC FUTURE is considered partially compatible with planning documents that identified some but not all of these goals and objectives. Based on the review undertaken for this analysis, the FRA determined that NEC FUTURE is compatible or partially compatible with the overall goals, objectives, and recommendations of the planning documents identified within the Study Area.

Of the approximately 75 unique planning documents identified within the Study Area, NEC FUTURE is compatible with 50 percent and partially compatible with the other 50 percent. Approximately 88 percent of all planning documents included goals and objectives related to passenger rail transportation and preservation of the built or natural environment. The No Action and Action Alternatives have the potential for inconsistencies with land cover-related goals and objectives regarding preservation of the built or natural environment due to potential conversions or acquisitions. This is especially true where the representative route goes off of the existing NEC in a new right-of-way, such as in Connecticut where the Alternative 3 route options may result in the conversion of Forest/Shrub and Wetlands. Approximately 62 percent of all planning documents included goals and objectives related to transit-oriented development. The Action Alternatives support these goals and objectives. (Appendix E, Section E.02, contains a list of all planning documents reviewed within the Study Area.)

7.2.7 Potential Mitigation Strategies

Potential mitigation measures for land cover conversions should include providing buffers or screening between new transportation uses and nearby land cover that may be sensitive to transportation use. Similarly, grade separation of some construction types (e.g., tunnel, aerial structure, and major bridge) will mitigate the conversion of land cover to transportation use by reducing the number of acres of impacts at the surface. Site-specific land cover mitigation measures for loss or fragmentation of habitat, dredge and fill of wetlands, encroachment of floodplains, and conversion of farmland/timberlands are presented in the resource-specific sub-sections that follow. Site-specific mitigation measures will be determined in consultation with localities during the Tier 2 analysis.

Conversion may result in acquisitions or displacements of private or public lands where the Representative Route diverts from the existing NEC. Developed land cover is more likely to result in displacement, while undeveloped land cover is likely to result in acquisition. Where acquisitions and displacements of developed or undeveloped land cover would occur, mitigation strategies should include providing relocation assistance and compensation, as appropriate, to affected property owners. Specifically, where displacement of households or businesses would occur, mitigation will include implementation of a relocation program in accordance with the federal *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970*, as amended (Uniform Relocation Act) as well as any state regulations. The availability of replacement housing in the Study Area will be compared with the housing needs of displaced households, and measures will be proposed to resolve

special relocation needs, if any. A similar evaluation will be conducted for business and employment displacements. Mitigation options for displacements will need to document that the market inventory of housing or other facilities (such as commercial space or properties) will be adequate to relocate displaced activities. Measures to reduce or avoid adverse effects during the construction and operational phases of the project will also be identified, as appropriate.

7.2.8 Subsequent Tier 2 Analysis

Subsequent Tier 2 studies would further define the actual acreage of land cover that would be affected and would address specific effects to properties, zoning regulations, and development. The analysis would further identify and evaluate compatibility with state, regional, MPO, and local plans. Tier 2 analysis would identify acquisitions, temporary easements, and displacements, and would require compliance with the Uniform Relocation Act, as described above.